A COMPARATIVE REVIEW OF SAFETY CULTURES

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Executive Summary

Based on our analysis of the thirteen definitions of *safety culture* and incorporation of the concept of adaptable living system, we offer the following working definition of safety culture: *safety culture represents environmental and psychosocial factors that promote certain behaviors or attitudes and inhibit others.* The overall sustainability of a change program to mature into a *cultural* change will depend on three key factors:

- The level of organizational readiness for change and ability to remain focused on the goal
- The ability of top executives, their teams, and champions of change to clearly define the goal or purpose, align resources toward the accomplishment of that purpose, and empower its employees as well as managers to make the necessary changes in established organizational structures, processes, and policies
- A robust intervention and measurement to demonstrate improvement

It is possible for an organization to transition from normal to high reliability to ultrasafe, if it is able to purposefully ratchet its safety performance to the next higher level and demonstrate its ability to promptly adapt its structures, processes, and policies to be consistent with the established safety goals. In other words, it must achieve a dynamic balance between reliability (=safety) and resilience (=ability to reorganize or adapt).

The case examples from five different industries (nuclear power, aviation, chemical/ pharmaceutical, construction, and health care) illustrate that the attention provided to the inculcation of a strong positive safety culture depends on the degree of coupling between safety and operational/business survival—the tighter the coupling, the greater the integration of safety as a core organizational value.

- The Diablo Valley Nuclear Power Plant example illustrates how a strong safety culture is designed through extreme procedural control, redundancy, and regulatory oversight.
- ASAP, FOQA, VASIP, and CAST are some of the emerging examples in the aviation industry to illustrate collaborative efforts that are underway. These efforts are pushing safety performance toward the ultrasafe level through concerted efforts to improve safety performance beyond high reliability.
- The DuPont example illustrates how one could engage the organization in a collaborative relationship with the community and the regulators to achieve a phenomenal change in the quality of life of the entire community and public image of the company.
- Examples from Pfizer, Birse Rail, Octel, Woodrow Construction, Transco, and the US construction industry demonstrate the respective organization's efforts to improve workplace health and safety. The collaborative/participative processes used, the emphasis on management accountability for safety, and clear communication of safety goals are indicators of the improvement in their overall safety culture.
- The health care example illustrates how individual practitioners are customizing established practices from the aviation industry to improve patient safety and to comply with the hospital's accreditation requirements.

Finally, the authors present a new conceptual approach, the Purpose-Alignment-Control Model, to assist in building actionable safety culture change programs. This model integrates organizational, team, and outcome factors to foster sustainable, transferable, and lasting changes.

prevailing state of safety culture at a particular organization. Once the inter-relationships between the various factors are better understood, interventions can be more effectively designed and implemented to help organizations move toward the ultrasafe state.

The entire set of items composed from the above mentioned research is presented in Appendix A (Factors To Assess Multiple Dimensions of Safety Culture). Table 2 identifies the main factors, their related dimensions and provides an example of individual items.

Table 2: Assessing Multiple Dimensions of Safety Culture

Factors	Dimensions (Example Items in Parentheses)
Organizational Factors	**Identity** (e.g., Safety is a core value in this organization)
	Information Flow (e.g., Effective mechanisms exist to report safety hazards/discrepancies)
	Relationships (e.g., There is a spirit of cooperation between various departments/ organizational units)
	Leadership (e.g., Supervisors do not permit cutting corners to get the job done)
	Evaluation/Accountability (e.g., Employee selection processes gives due consideration to technical qualifications as well as attitude toward safety and teamwork)
Team Factors	**Professionalism** (e.g., Internal crosschecks on decisions, even at the micro level, and fail-safe redundancy to determine when critical decisions are timely and correct)
	Interpersonal Trust (e.g., My supervisor can be trusted to act in the interest of safety)
	Goal Sharing (e.g., Operational goals are very clear and consensus is unequivocal)
	Adaptability/Resilience (e.g., There is sufficient degree of resource availability, human redundancy, and a highly functional, highly flexible division of labor)
	Support Systems (e.g., Training and monitoring encourage a culture of responsibility and accountability)
Outcome Factors	**Employee Satisfaction** (e.g., Morale and motivation in this organization are high)
	Customer Satisfaction (e.g., Customer satisfaction is high and consistent across multiple organizational units)
	Public Image/Perception (e.g., The organization is highly regarded by the public-at-large as a safe/reliable organization)
	Regulatory Compliance (e.g., Compliance with local, national, and international regulations is high and consistent with the reputation of the organization)
	Stakeholder Value (e.g., Employees are primary stakeholders; customers are secondary stakeholders)

APPENDIX A: FACTORS TO ASSESS MULTIPLE DIMENSIONS OF SAFETY CULTURE

This appendix contains a list of factors and related items selected from past research to assess safety climate/culture and organizational change. Items have been derived from: Hofstede (1984); Helmreich, Fouchee, Benson, and Russini (1986); Westrum (1993); Taylor (1995); Helmreich and Merritt (1998); Ciaverelli (1998); Gaba, Singer, Bowen, and Ciavarelli (2003); IOMA (2003); Patankar and Taylor (2004); Patankar (2003); Wiegman, von Thaden, and Wiegmann (2003); Gibbons, von Thaden, and Wiegmann (2004); Hackworth et al. (2004); Wheatly (1999); Knowles (2002); and Collins and Porras (1997). Items are grouped into the following categories: organizational factors, team factors, and outcome factors.

Organizational Factors

Identity
1. Safety is a core value in this organization
2. This organization has a reputation for high-quality performance
3. Safety is an integral part of all operations
4. This organization does not compromise safety to get the work done or to accomplish the mission
5. There is a high degree of consistency between words and actions throughout this organization
6. This organization must adapt to internal and external influences without compromising the core purpose or value.

Information Flow
1. Effective mechanisms exist to report safety hazards/discrepancies
2. Safety goals of the organization are communicated consistently throughout the organization
3. Good communication flow exists up and down the organization chain of command
4. People report safety hazards/discrepancies
5. People believe that their safety-related suggestions will be considered seriously
6. Best practices are communicated regularly to all employees
7. Safety successes are celebrated
8. Mechanisms for field employees to communicate directly with top executives exist and are effective
9. Top executives visit with the field employees adequately
10. Gaps between corporate propaganda and employee/management behavior are addressed promptly and effectively

Relationships
1. There is a spirit of cooperation between various departments/organizational units
2. This organization is like a small family
3. People talk about safety or operational issues regardless of their position in the organizational hierarchy

4. The employee-management relationship is cordial and mutually respectful
5. The organization and its employees make positive contributions to their civic communities

Leadership
1. Supervisors do not permit cutting corners to get the job done
2. Risk decisions are made at the proper level, by most qualified people
3. Organization's leaders consider safety issues during the formation and execution of operational and training plans
4. Organizational leadership encourages reporting safety discrepancies without the fear of negative repercussions
5. Leaders encourage everyone to be safety conscious and follow the rules
6. Leaders model strong, positive safety behaviors—sets the example for compliance with operating standards
7. The Safety Officer/Director position is a desirable job in my organization
8. The senior company management is seriously interested in reviewing the effectiveness of our safety program.
9. Leaders support their subordinates in handling unique situations based on their skill and knowledge.
10. Leaders are well-trained to handle technical, business, as well as human issues throughout the organization and its stakeholders

Evaluation/Accountability
1. Employee selection process gives due consideration to technical qualifications as well as attitude toward safety and teamwork
2. Employees as well as supervisors are evaluated on their safety performance
3. Good safety performance is rewarded
4. Poor safety performance is corrected
5. Performance and safety behaviors are integrated in annual evaluations
6. Evaluations are meaningful and connected with the organizational mission/goals
7. Personnel in the organization conduct continuous technical proficiency training
8. Performance standards are clearly communicated and uniformly applied
9. Employee/Management evaluations are closely linked with organizational vision and goals
10. Reward/penalty system is fair, applied consistently, and well understood.

Team Factors

Professionalism
1. Internal crosschecks on decisions, even at the micro level, and fail-safe redundancy to determine when critical decisions are timely and correct
2. It is acceptable for employees to refuse high-risk procedures when they are personally stressed or fatigued
3. Employees are not expected to perform jobs for which they have not been trained

4. When employees perform new or unique jobs, adequate redundancy and backup systems are in place in order to minimize the probability of failure
5. Individuals are held accountable for high ethical standards

Interpersonal Trust
1. My supervisor can be trusted to act in the interest of safety
2. Management has a reputation for high integrity
3. My safety ideas would be acted on if reported to supervisor
4. My supervisor protects confidential or sensitive information
5. Managers trust that their subordinates will execute the delegated task in the most professional manner.

Goal Sharing
1. Operational goals are very clear and consensus is unequivocal
2. Every team member understands the team's goals, performance standards, and his/her specific role on the team.
3. Adequate support systems including training, equipment, and information are provided to make the goals achievable.
4. There is a high degree of consistency between organizational goals/vision, unit goals, and individual goals.
5. Incentives are tightly coupled with goal attainment

Adaptability/Resilience
1. There is sufficient degree of resource availability, human redundancy, and a highly functional, highly flexible division of labor
2. Skill and knowledge rather than bureaucratic authority drive decision making
3. Management reacts well and readily adapts to unexpected changes
4. Dynamic and reliable data are available and adequate latitude is provided for field personnel to make timely decisions
5. Technological innovations/solutions are effectively matched with human performance capabilities without compromising safety

Support Systems
1. Training and monitoring encourage a culture of responsibility and accountability
2. High level of social control by limiting influences from environments external to the organization
3. Employees are provided with adequate resources (time, staffing, budget, and equipment) to accomplish their job safely
4. Adequate support systems such as counseling services and training exist to improve safety performance
5. Employees who report their weaknesses in technical knowledge/skill, safety issues or organizational mission are provided with timely and appropriate support
6. Norms, policies, and procedures that hinder safe operations are actively changed
7. Mechanisms to change established norms, policies, and procedures are effective and efficient

8. Undesirable events are viewed as learning opportunities and systemic improvements are implemented promptly
9. Standardization of low-level tasks is enforced; autonomy in high-level tasks is granted; and appropriate mechanisms exist to actively reduce the risk in rare or ground-breaking procedures.
10. Non-punitive error and hazard reporting systems are highly effective in addressing systemic issues within the organization as well as in the industry.

Outcome Factors

Employee Satisfaction
1. Morale and motivation in this organization are high
2. People believe that their organization is making satisfactory progress
3. People take pride in their job in this organization
4. People feel that their contributions are valued and their role is important for the overall success of the organization
5. Fair, non-punitive, consistent, and effective mechanisms exist to address dissatisfaction

Customer Satisfaction
1. Customer satisfaction is high and consistent across multiple organizational units
2. Customer retention is high
3. Frontline employees are given the latitude to make appropriate changes in the protocol in order to satisfy the customer
4. Employees are encouraged not to sacrifice personal integrity and loyalty in the interest of customer satisfaction
5. Standards of customer satisfaction are clearly communicated throughout the organization

Public Image/Perception
1. The organization is highly regarded by the public-at-large as a safe/reliable organization
2. The organization has received top awards for safety performance
3. The organization is considered as a role model for top safety performance among the peer organizations in the industry
4. The organization is actively involved in raising the industry standards for safety performance
5. The organization is actively involved in raising public awareness about safety issues and in holding their top management accountable for raising the safety standards for the industry

Regulatory Compliance
1. Compliance with local, national, and international regulations is high and consistent with the reputation of the organization
2. The organization is actively involved in shaping the future regulations through appropriate industry-civic-regulatory advisory groups
3. Effective auditing and monitoring/reporting mechanisms exist to detect regulatory violations
4. The organization practices voluntary disclosure of regulatory violations when appropriate

5. Compliance with regulatory requirements is viewed as the baseline standard of performance.

Stakeholder Value
1. Employees are primary stakeholders; customers are secondary stakeholders
2. The organization demonstrates a social or civic responsibility toward the welfare of the larger community/environment within which the organization functions
3. The organization is practices continuous learning and improvement within the organization
4. The success of the organization is reflected in the success of its stakeholders
5. All stakeholders are treated with respect and compassion